Date.	Ship's position.	Hour of observation.	Barometer.	Wind direction.	Force.	Remarks.
1882.						
Aug. 4		Noon.	29.640	e.	7	Moderate gale; no observations.
4		2 p. m.		e.	7	Moderate gale; overcast and gloomy.
4		4 p. m.	29.550	e. by n.	8	Barometer falling; fresh gale.
4		6 p. m.		ene.	8	Wind backing.
4	N. 32° 41′, E. 134° 40′	8 p. m.	29.550	ene.	8	Shipping heavy water.
4		10 p. m.		ene.	8	Fresh gale and high sea.
4		Midnig't.	29.550	ene.	8	Fresh gale and squally.
5		2 a. m.	29.530	ene.	9	Strong gale.
5		4 a. m.	29.475	ene.	10	Whole gale; heavy sea.
5		6 a. m.	29.3 0	e.	10	Put ship's head to se. by s. on port tack.
5		8 a. m.	29.345	e.	10	Terrific squalls accompanied by heavy rain.
5		10 a. m.	29.200	e.	10	Wind veering.
5		Noon.	29.120	e. by s.	11	Wind increasing and sea rising; confused.
5		2 p. m.	29.180	ese.	12	Wind, typhoon force.
5		4 p. m.	29.260	se. by s.	12	High confused sea; wind typhoon force.
5		6 p. m.	29.400	sse	11	Less wind.
5	About N. 32° 56′, E. 135° 46′	8 p. m.	29.665	s.	10	Whole gale and high sea.
5		10 p. m.	29.710	s.	8	Moderating fast.
5		Midnig't.	29.755	s.	6	Reduced to strong breeze and overcast.
6		2 a. m.	29.755	s.	4	Hauled up nne. to e.
6		4 a. m.	29.760	s.	4	Wind and sea moderating; clouds breaking.
6		6 a. m.		s.	3	Squally with heavy rain.
6		8 a. m.	29.860	s.	3	Thick hazy weather and squally.
6		10 a. m.		s.	3	Thick weather.
6		Noon.	29.945	s.	3	Same weather.
6		2 p. m.		s.	3	Same weather.

Remainder of the passage had light variable winds, and overcast, misty weather. Arrived at Yokohama at noon of the 7th.

In connection with the above typhoon, the U. S. S. "Palos," at Kobe, Japan, reports as follows:

"During the morning and forenoon of August 4th, weather clear and pleasant, wind varying from e. by n. to ese., until about 11:00 a. m., when squalls of wind and rain began to pass over from the eastward; barometer falling slowly from 29.86 at 8:00 a. m. to 29.84 at noon, after which time, weather cloudy, with rain, moderate to fresh breezes from the east; barometer fell irregularly from 29.84 to 29.79 at 4:00 p. m. From 4:00 p. m. to midnight, weather cloudy, with light drizzling rain, fresh breezes in quick squalls from e. and e. by n.; barometer falling steadily to 29.69 at midnight. From midnight to 4:00 a. m. of the 5th, weather overcast and cloudy, wind in heavy squalls from the e.; barometer falling irregularly to 29.60 at 4 o'clock. From 4:00 to 8:00 a. m., overcast and cloudy, occasional breaks in the clouds showing blue sky and an upper stratum of cirro-cumulus clouds nearly stationary, the lower strata, throughout the gale, were composed of dark cumulus and nimbus clouds traveling with the wind. Barometer 29.53 at 8:00 a. m., wind in squalls from the e., force 6 to 8. From 8:00 a. m. to meridian, weather cloudy, with light drizzle occasionally; moderate to strong gale from e. and e. by n. in squalls; heavy rain-clouds to the southward, making toward the east; moderate sea, ship rolling easily and pitching occasionally; a brig, farther out in the harbor, dragging with two anchors down; barometer falling rapidly to 29.38 at noon. From meridian to 8:00 p. m., weather overcast and cloudy, with drizzling rain; wind blowing moderate to strong gale, increasing at 4:00 p. m.; barometer 29.24; heavy sea, ship rolling and pitching heavily. At about 5:45 p. m., barometer began to rise; lowest reading 29.24; moderate to strong gale in squalls; at 5:45 p. m., wind suddenly shifted to s. by e. in a heavy squall, blowing a gale for a few minutes, when it suddenly backed to se. and blew as hard for a short time. At 6:00 p. m., barometer 29.30; wind gradually decreasing; from 7:00 to 8:00 p. m., fresh breeze to moderate gale; barometer at 8:00 p. m., 29.48; heavy sea from the southeast, breaking along the whole length of the Bund, half as high as the houses on the opposite side. From 8:00 p. m. to midnight, overcast and cloudy, with rain; moderate to fresh breeze from se. during the first two hours, decreasing to light breeze and hauling to e.; barometer rising; at midnight, 29.59."

INTERNATIONAL METEOROLOGY.

International charts iv. and v. accompany the present number of this REVIEW. Chart iv. is published for June, 1880, and continues the series of that chart begun in January, 1877. Chart v. is prepared for September, 1880, and continues the series of that chart from November, 1877. In the description of these charts, much valuable information has been obtained from the "Monatliche Uebersicht der Witterung," published by Professor Dr. G. Neumayer, Director of the German Marine Observatory at Hamburg, and from the "Bulletin Mensuel," published by Mr. Marc Dechrevens, of Zi-Ka-Wei, China.

Chart iv. exhibits the mean pressure, mean temperature, and the prevailing direction of the wind over the northern hemisphere for the month of June, 1880, as determined from one observation taken each day at 7.35 a. m., or 0.43 p. m. Greenwich mean time. The area of lowest mean pressure, 29.40 (746.7), occupies part of British India, where the lowest mean pressure was 29.35 (745.5) at Lahore.

The isobar of 29.6 (751.8) covers that part of Asia lying between the sixtieth and one-hundredth meridians, and between 20° and 40° north latitude, excepting the province above mentioned.

The isobar of 29.7 (754.4) occupies the region between the fortieth and fiftieth parallels, and extends from the interior of China to the eastern shores of the Caspian Sea.

The isobarometric line of 29.8 (756.9) covers the eastern part of China and the whole of Siberia.

In Europe the isobar of 29.8 (756.9) includes within its limits Russia, Austria, Sweden and Norway, Denmark and northern Germany.

Two areas of barometric maxima appear on the chart, one of which occupies the Atlantic ocean from N. 20° to N. 45°, and from the coasts of Portugal and Morocco westward to the forty-fifth meridian, the region of highest mean pressure, 30.3 (769.6), being over the Azores. The other, 30.1 (764.5), covers that portion of the ocean between the West Indies and the sixty-fourth meridian.

In the United States, the area of highest mean pressure occupies Florida, Alabama and Georgia, while the isobar of 30.0 (762.0) covers the north Pacific coast. In British America, the isobar of 30.0 (762.0) extends over Canada and Hudson's Bay.

Compared with the preceding month (May), but slight changes have occurred in the distribution of atmospheric pressure. In the United States, the pressure has decreased in the north Pacific coast region; it has also decreased slightly over the Atlantic coast, between 35° and 40° north latitude; over the interior of the country, the pressure shows no material change. In Canada, there was a slight decrease.

In Europe, the pressure has decreased over the entire continent, except in the southern peninsulas and in France, where there has been a slight increase. In Greenland, the pressure has increased; the mean barometer at Godthaab being about 0.15 inch above the mean for May. In Iceland, the mean pressure was slightly below that of the preceding month.

In Asia, the mean barometric pressure has averaged about 0.20 inch below the mean for May, in Hindostan; and about 0.10 inch below in China, Japan and Siberia.

Compared with the corresponding month of previous years, the pressure was slightly above the normal in that part of the United States lying east of the ninty-second meridian, except in New England, where it was about 0.03 inch below; west of the above-mentioned meridian, the pressure ranged from 0.03 to 0.05 inch below the normal. In Canada, the mean pressure was slightly above the average, except in the eastern part of Nova Scotia.

The following table exhibits the mean pressure and mean temperature for the month of June, 1880, in the several countries of Europe and Asia, as determined from observations taken during June in the years 1877, 1878 and 1879:

Countries.	Mean Barometer.			Mean Temperature.		
	June, 1877, 1878 and 1879	June, 1880.	Departure.	June, 1877, 1878 and 1879.	June, 1880.	Departure.
Algeria	30.05	30.06	+0.01	83.2	81.6	— 1.6
Austria	29.95	29.87	−0.08	72.9	70.3	— 2.6
British Isles	29.87	29.93	+0.06	60.8	59.5	— 1.3
Denmark	29.90	29.87	−0.03	61.3	62.1	+ 0.8
France	29.98	29.97	−0.01	72.3	66.0	— 6.3
Germany	29.97	29.91	−0.06	69.2	66.7	— 2.5
India	29.55	29.52	−0.03	89.2	88.2	— 1.0
Italy	30.00	29.96	−0.04	77.9	74.8	— 3.1
Norway	29.80	29.85	+0.05	58.6	60.9	+ 2.3
Portugal	30.07	30.08	+0.01	72.5	69.4	— 3.1
Russia	29.88	29.84	−0.04	71.6	69.2	— 2.4
Spain	30.00	30.05	+0.05	77.1	71.3	— 5.8
Sweden	29.82	29.86	+0.04	59.8	59.1	— 0.7
Turkey	29.96	29.91	−0.05	80.0	80.0	normal

The accompanying table shows the deviations in pressure and temperature at isolated stations during the month of June, 1880, as compared with the mean of three years:

Comparative Thermometric and Barometric Means, with corresponding Departures.

STATION.	Mean Barometer.			Mean Temperature.		
	June, 1877–78–79.	June, 1880.	Departure.	June, 1877–78–79.	June, 1880.	Departure.
				°	°	°
Laghouat	30.05	30.06	+0.01	94.5	87.4	— 7.1
San Jose de Costa Rico				68.8	68.2	— 0.6
Gibraltar	30.01	30.06	+0.05	75.1	72.8	— 2.3
Malta	30.00	29.96	−0.04	78.8	75.6	— 3.2
Sandwick Manse	29.84	29.94	+0.10	54.2	55.5	+ 1.3
Bridgetown	30.01	30.03	+0.02	82.5	81.8	— 0.7
Cape Town	30.13	30.20	+0.07	61.5	65.8	+ 4.3
Fort Napier	30.01	30.14	+0.13	68.4	67.7	— 0.7
Free Town	29.97	29.91	−0.06	84.2	85.6	+ 1.4
Hobart Town	29.93	29.93	normal	48.6	49.3	+ 0.7
Mauritius	30.15	30.14	−0.01	73.0	72.4	— 0.6
Melbourne	30.16	30.07	−0.09	47.5	49.2	+ 1.7
Nassau	30.03	30.08	+0.05	82.3	82.6	+ 0.3
Godthaab	29.80	29.91	+0.11	42.4	41.0	— 1.4
Stykkisholm	29.79	29.87	+0.08	48.4	51.3	+ 2.9
Thorshavn	29.83	29.93	+0.10	51.1	52.3	+ 1.2
Fort-de-France	29.89	30.24	+0.35	82.0	80.2	— 1.8
Zi-Ka-Wei	29.79	29.82	+0.03	71.2	69.4	— 1.8
Athens	29.94	29.89	−0.05	84.4	85.1	+ 0.7
Lahore	29.44	29.35	−0.09	100.4	103.3	+ 2.9
Cagliari	29.98	29.97	−0.01	78.9	76.1	— 2.8
Tokei	29.86	29.88	+0.02	68.6	64.7	— 3.9
Tromso	29.76	29.76	normal	48.7	46.8	— 1.9
Angra	30.15	30.30	+0.15	66.1	69.3	+ 3.2
Funchal	30.16	30.24	+0.08	71.5	69.3	— 2.2
Ponta Delgado	30.15	30.29	+0.14	69 6	70.0	+ 0.4
Archangel	29.75	29.74	−0.01	57.8	56.8	— 1.0
Tiflis	29.84	29.85	+0.01	78.9	78.1	— 0.8
Astrakhan	29.84	29.88	+0.04	81.2	80.6	— 0 6
Ekaterinburg	29.70	29.74	+0.04	64.6	64.0	— 0.6
Nukuss	29.88			84.3		
Tashkend	29.80	29.67	−0.13	84.1	85.3	+ 1.2
Barnaul	29.71	29.64	−0.07	69.8	66.7	— 3.1
Yeniseisk	29.70	29.81	+0.11	66.0	64.4	— 1.6
Pekin	29.89	29.75	−0.06	77.2	74.5	— 2.7
Nikolaievsk on the Amoor				50.7	51.3	+ 0.6
San Juan de Puerto Rico	30.02	30.10	+0.08	82.7	81.7	— 1.0
Beirut	29.85	29.82	−0.03	84.3	82.8	— 1.5
Mexico	30.07	30.00	−0.07	58.0	58.1	+ 0.1
Havana	30.02	30.09	+0.07	82.2	80.0	— 2.2
Navassa	29.97	30.00	+0.03	81.2	80.7	— 0.5
Paramaribo	30.03	30.17	+0.14	81.1	79.2	— 1.9
York Factory	29.94	30.02	+0.08	47.6	43.6	— 4.0

In the United States, the temperature was generally above the normal in the country east of the Rocky mountains, while deficiencies, ranging from 1°.2 to 3°.8 occurred from the one hundred and twelfth meridian westward to the Pacific.

In Europe, the temperature was slightly below the normal, except in Denmark and Norway, where there was a slight excess.

The following are some of the extreme monthly mean temperatures reported at isolated stations:

HIGHEST.	Degrees.	LOWEST.	Degrees.
Freetown	85.6	Godthaab	41.0
Manilla	83.8	York Factory	43.6
Bridgetown	81.8	Tromsoe	46 8
Navassa	80.7	Nikolaievsk on the Amoor	51.3

In British India, the temperature was slightly below the normal; the highest mean temperature, 103°.3 Fahr., or 39°.6 Cent., was reported from Lahore, and the lowest, 72°.3 Fahr., or 22°.4 Cent., occurred at Belgaum.

The prevailing direction of the winds over the United States were: East of the ninetieth meridian, generally southwesterly; in the interior of the country, southerly; in Texas, southeasterly. West of the one hundredth meridian, the prevailing directions were northerly to northwesterly north of the fortieth parallel; and south of that parallel, southerly to southeasterly.

In Canada the winds were generally westerly to northerly.

In Europe, the prevailing directions were: Northerly in the northern, and southwesterly in the southern portions of the British Isles; in Germany they were westerly, except on the shores of the Baltic, where the wind was generally northeasterly; in France, westerly; in Denmark, westerly and easterly; in Sweden and Norway, generally northwesterly; in northern Spain, northeasterly, and in the other portions of the country generally southwesterly; in Italy, southwesterly; in Algeria the winds were mostly northwesterly.

In Hindostan, the prevailing winds were southwesterly in the provinces west of the eightieth meridian; and east of that meridian they were generally easterly. At Zi-Ka-Wei, in China, the prevailing wind was easterly, and in Japan it was generally southerly.

Over the north Atlantic ocean, from N. 30° to N. 50° and westward from the fiftieth meridian, the prevailing wind was northerly, except near the coast of the United States, where it was southwesterly; east of the fiftieth meridian, the winds were generally southwesterly and westerly, except near the coasts of Scotland and Ireland, where they were northerly.

The following brief notes, descriptive of the weather conditions over central Europe, are taken from the "Monatliche Uebersicht der Witterung," published by Professor Dr. G. Neumayer, of Hamburg:

The marked meteorological feature of the month was the excessive rainfall, causing disastrous floods in many parts of Germany and Austria, whereby great loss of life and damage to property occurred. (See INTERNATIONAL METEOROLOGY, low area xii., May REVIEW.) An unusual number of thunderstorms occurred, accompanied in most cases by heavy hail, which greatly damaged growing crops.

Unusual and excessive rain-falls also occurred in China during the month under consideration, and were noted in connection with the storms occurring in China, in the May REVIEW.

Chart v., exhibits the paths of barometric depressions which have been traced from the daily international charts for the month of September, 1880.

The data are charted for each day of the month on the charts accompanying the "International Bulletin" for that day, and from these charts and additional reports, the movements of the centres of barometric minima are traced.

Twenty-three of the principal storms occurring over the northern hemisphere have thus been traced.

Concerning the general distribution of these depressions, the following is given:

Twelve appeared in the United States and Canada, three of which have been traced as continuous storms across the Atlantic.

Nine depressions appeared over Europe, and were principally confined to the northern parts of the continent.

Two areas of barometric minima are traced in eastern Asia, and on the chart are also exhibited the tracks of four typhoons, which occurred over the China Sea during September, 1880.

The following brief descriptions are given of the storms first appearing within the limits of the Signal Service stations:

I. This was a continuation of the West Indian hurricane, which passed over Florida, and was described as low area xi., in the July REVIEW. The disturbance was central in Mississippi on the morning of the 1st, and moving in a course slightly west of north, was central in Iowa on the 2d. Its course then changed to northeast, and the depression moved towards the lake region, where it was central, with increasing pressure, on

the 3d. During the 4th and 5th, it passed down the Saint Lawrence valley and across the Gulf of Saint Lawrence; and on the 6th was probably central in about N. 50°, W. 50°. Moving eastward, the centre of disturbance was near N. 50°, W. 40°, on the 7th, the s. s. "Ethiopia," in N. 51° 29′, W. 37° 00′, reporting barometer 29.60 (751.8), wind southwest, force 1; and the s. s. "Indiana," probably southwest of the centre, in N. 49° 07′, W. 42° 38′, barometer 29.73 (755.1), wind northwest, force 4. On the 8th, the storm was central near N. 51°, W. 30°, the s. s. "Algeria," in N. 49° 25′, W. 29° 15′, reporting barometer 29.78 (756.4), wind wsw., force 5. The course then changed to northeasterly, and on the 9th the depression probably became merged in an extensive depression covering the ocean, and hereafter described as low area xv.

II. This depression appeared in Manitoba on the 1st, and on the 2d, it moved east-northeastwardly to Hudson's Bay, and disappeared beyond the stations of observation.

III. This storm probably developed north of the Bahamas on the 7th, and moved northeastward along the Atlantic coast. On the morning of the 8th, the centre was probably off Cape Hatteras; the s. s. "Arrow," in N. 34° 40′, W. 74° 00′, reporting: 2 a. m., of the 8th, barometer 29.40 (746.7), hard southerly gale; 3 a. m., barometer falling rapidly, wind veering to southeast, with violent squalls and high, confused sea; 4 a. m., barometer 29.15 (740.4), wind veering rapidly from east to northeast, north, and northwest; 8 a. m., barometer rising steadily, wind west-northwest. On the same day, the brig "Eastern Star," in N. 33°, W. 73°, had a hurricane from west-southwest, with very high sea, lasting six hours; also, the bark "Camella," in N. 40°, W. 69°, encountered a hurricane from east-southeast to south and southwest, lasting eight hours. On the 9th, the brig "T. H. A. Pitt," in N. 42° 05′, W. 64° 30′, reported: 3 a. m., barometer 29.50 (749.3), wind blowing a perfect hurricane; 5 a. m., barometer 29.40 (746.7), wind south-southwest; 10 a. m., wind moderating and hauling to westerly. The schooner "Delia Hodgkins," in N. 42° 20′, W. 67° 30′, reported barometer 29.44 (747.8), wind northeast, force 8, heavy sea; the s. s. "Britannic," in N. 43° 51′, W. 57° 48′, reported: barometer fell rapidly from 30.06 (763.5) to 29.85 (758.2), wind suddenly shifting from east to southwest, and blowing a violent gale, with high sea; at 6 p. m., the barometer read 29.95 (760.7), wind and sea moderating. On the 10th, the depression passed northeastward along the coast of Nova Scotia; and on the 11th, was probably central, with increasing pressure, near the entrance to the Gulf of Saint Lawrence. On the 12th, the disturbance finally disappeared north of Newfoundland.

IV. This depression probably developed in the Gulf of Mexico on the 7th. Moving northeastward through Florida, Georgia, and South Carolina on the 8th, the disturbance was central with increasing energy, off the North Carolina coast, on the 9th. The bark "J. Chase," in about N. 35°, W. 73°, reported severe northeast gale, and the schooner "Florence and Lillian," in N. 33° 40′, W. 78°, heavy sse. gale, veering to s., lost sails, etc.; ship "Oakland," in N. 37°, W. 73°, heavy ssw. to w. gale, lasting twelve hours. On the 10th, the storm reached the New England coast, and on the 11th had passed to the eastward of Cape Breton Island. Moving eastward on the 12th, the disturbance was probably central over the Atlantic near N. 48°, W. 40°, the s. s. "Adriatic," in N. 48° 27′, W. 39° 56′, reporting, barometer 29.67 (753.6), wind wnw., force 6, showery. On the 13th, the depression moved with increasing energy towards the European coasts, where it appeared as a very severe storm. The following vessel reports serve to indicate the severity of the storm: 13th, s. s. "Greece," in N. 49°, W. 24°, moderate to strong gale and squally; s. s. "Henry Edye," in N. 50° 30′, W. 22° 30′, terrific hurricane from nw., lasting three hours, when it moderated to a steady gale for eight hours; in N. 50° 27′, W. 24° 00′, the bark "Good Intent," had a severe hurricane from s. to e. and n., lasting twenty-four hours; s. s. "Baltic," in N. 51° 45′, W. 17° 35′, barometer 29.51 (749.5), wind sw., force 4, raining. The subsequent course of this depression is described as low area xvii., and is classed with the storms appearing over Europe.

V. This disturbance appeared in Dakota on the 9th, Bismarck barometer reading 29.84 (757.9), being a fall of 0.35 inch in twenty-four hours. The storm passed to the eastward with its centre north of the lake region during the 10th, 11th, and 12th, and on the 13th, the disturbance finally disappeared over Labrador.

VI. This area developed in Pennsylvania during the 14th, and moving northeastward, was central off the New England coast on the 15th, Boston reporting barometer, 29.70 (754.4), wind w. On the 16th, the disturbance moved north-northeastwardly over New Brunswick and disappeared on the following day to the northward of the Gulf of Saint Lawrence.

VII. This area developed in Manitoba on the 14th, and passed northeastwardly to York Factory on the 15th, the barometer at that station reading 29.30 (744.2), wind se., raining; moving northeastwardly, the depression disappeared over Hudson's Bay. Reports from York Factory state that a violent gale occurred along the valley of the Saskatchewan and on Cedar Lake (N. 53°, W. 102°) during the 11th and 12th, and southeasterly gales prevailed at the entrance to Hudson's Straits, whereby the company's ships were detained ten weeks.

VIII. This depression apparently developed in the Saskatchewan vallay during the 15th, and moving southeastward, was central in Dakota on the 16th. Continuing its southeasterly course, the disturbance was central in Wisconsin on the 17th, and on the 18th it moved into Nebraska. The course then changed to northeasterly, and the depression crossed lakes Michigan and Huron, with its centre near Alpena on the morning of the 19th. During the 20th and 21st, the storm moved down the Saint Lawrence valley; and, crossing the Gulf, was probably central in Newfoundland on the 22d. By the 23d, the depression had moved eastward over the ocean, and was central in about N. 50°, W. 45°, the s. s. "Ethiopia," in N. 48° 41′, W. 44° 51′, reporting barometer 29.57 (751.1), wind sse., force 6, raining; and the s. s. "Wisconsin," in N. 49°, W. 39°, encountered a heavy northerly gale, with high sea. On the 24th, the storm was apparently central near N. 53°, W. 37°, the s. s. "Ethiopia," in N. 50° 22′, W. 38° 30′, reporting barometer 29.33 (745.0), wind wsw., force 6, heavy cross sea and showery; s. s. "Blythville," in N. 55° 07′, W. 32° 00′, encountered heavy gale from the eastward, running round to west, and lasting thirty-six hours. On the 25th, the disturbance was near N. 55°, W. 30°, the s. s. "Ethiopia," in N. 52° 57′, W. 31° 13°, reporting barometer 29.26 (743.2), wind s., force 3, high confused sea; s. s. "Republic," in N. 50° 37′, W. 30° 42′, moderate sw. gale, barometer 29.51 (749.5). On this day an extensive area of low barometer covered the ocean between the meridians of 25° and and 40° west; and on the 26th, the centre of lowest pressure had moved to the southwestward, and was near N. 50°, W. 35°, the s. s. "Republic," in N. 49° 24′, W. 36° 47′, reporting barometer 29.45 (748.0), wind w., force 6, heavy sea; s. s. "Rhein," in N. 49° 36′, W. 38° 00′, heavy nw. to wsw. storm, high sea and heavy rain. On the 27th, the s. s. "Algeria," in N. 45° 50′, W. 39° 35′, reported barometer 29.52 (749.8), wind nw., force 6, squally; and the s. s. "Ohio," in N. 49° 22′, W. 36° 34′, barometer 29.56 (750.8), wind se., force 3, showery. During the 28th, 29th and 30th, this depression remained stationary as a severe storm over mid-ocean; its eastward movement being barred by an area of high pressure (30.40 or 772.1), which prevailed over western Europe, and as far westward as the twentieth meridian. The following vessel reports serve to indicate the severity of this storm during the last days of the month: The s. s. "Kate Fawcett," sixty miles north of Fayal, encountered a hurricane from sw., veering to ne., and lasting nine hours; s. s. "Powhatan," three days after leaving Gibraltar (about September 29th), encountered a hurricane which lasted two days; 30th, s. s. "Olympus," in N. 48°, W. 35°, had a strong ese., e. and ene. gale, with high sea; at midnight of the 30th, the bark "Romance" encountered a heavy gale, increasing to hurricane, with s., veering to e. and n. winds,

barometer 29.00 (736.6 . This storm was especially severe over the Western Islands, several vessels having foundered off Saint Michael, and many others put into that port in distress.

IX.—This disturbance appeared on the north Pacific coast on the 22d, and moving slightly south of east, was central in Montana on the 23d; Virginia City, barometer 29.65 (753.1). Following a northeasterly course during the 24th, the centre of disturbance reached Dakota; passing thence through Minnesota and across Lake Superior, the depression entered Ontario, where it disappeared on the 25th.

X.—This depression was first observed in Kansas on the 25th, and moved in a northeasterly direction to Wisconsin, where it was central on the morning of the 26th. Continuing its course, the centre reached Ontario on the 27th, and disappeared in the Saint Lawrence valley on that day.

XI.—During the 27th, the pressure decreased in North Carolina, and by the morning of the 28th, the disturbance was central in Pennsylvania. Following a northeasterly course through the New England states, the depression crossed the Saint Lawrence on the 29th, with its centre near Farther Point, and finally disappeared over Labrador.

XII.—This depression developed in the Saskatchewan valley on the 27th, and moved southeastward over Lake Superior on the 28th, causing severe squalls and rough weather on the lakes. During the 28th and 29th, the disturbance moved down the Saint Lawrence valley and disappeared on the latter date.

Of the storms appearing over Europe, the following is given:

XIII.—This depression first appeared off the eastern coast of Greenland on the 1st, and passing eastward, south of Iceland, was probably central on the 2d, off the coast of Norway. The centre of disturbance passed over northern Norway and Sweden, and reached the White sea on the 3d; the centre then followed a southeasterly course, and by the 4th was near Kasas. Continuing its southeasterly movement, the depression passed to the northeast of the Caspian sea on the 5th, when its course apparently changed to northeast and the disturbance passed into Siberia with its centre probably near Tobolsk; on the 7th, the area disappeared north of Yeniseisk.

XIV.—This low-area apparently developed over the ocean near W. 20° and south of N. 60° on the 4th; the s. s. "Indiana" in N. 51° 34′, W. 22° 02′, reported barometer 29.39 (746.5) wind sw., force 7; heavy northwest sea; and the s. s. "Ethiopia" in N. 55° 18′ W. 16° 34′, barometer 29.48 (748.8) wind se., force 4; heavy to moderate ssw. swell. Moving in a northeasterly direction, the storm-centre reached N. 60°, W. 15°, on the 5th, the bark "Markland" in N. 59° 25′, W. 17° 10′, reporting, barometer 29.14 (740.1), wind sse. force 5; showery. On the 6th, the storm was probably near the Farŏe Islands, the barometer at Thorshavn, reading 29.17 (740.9), wind ne., force 4; and on the 7th the disturbance had entered Norway. Crossing the Gulf of Bothnia by an east-southeasterly course, the centre reached Kuopio on the 8th; its course then changed to northeasterly, and the disturbance disappeared in the Arctic regions on the 9th.

XV.—This depression probably developed in southern Greenland on the 7th, and passed in a southeasterly course to about N. 55°, W. 25°, where it was central on the 8th, the bark "Markland" in N. 56° 05′, W. 28° 40′, reporting barometer, 29.43 (747.5), wind ssw., force 7. On the 9th, the centre apparently pursued a northeasterly course after uniting with low area i., and on the 10th, was probably near the northwestern coast of Scotland. On the 11th, the disturbance was near the Farŏe Islands, the barometer at Thorshavn reading 29.30 (744.2), being a fall of 0.51 inch, in twenty-four hours; on the following day the depression disappeared to the northeast of Iceland.

XVI.—This area first appeared off the west of Ireland on the 12th, the s. s. "Peruvian" in N. 55° 37′, W. 14° 06′, reporting barometer 29.46 (748.3), wind sw., force 3. Moving in a northeasterly direction, the storm crossed the northern part of Scotland on the 13th, and was central off the Norwegian coast on the 14th; after which date it ceased to exist as a depression.

XVII.—This is a continuation of low-area iv., described in this REVIEW, and was the most important of the month in Europe, on account of its severity and the unusual course of the centre after reaching the continent. On the morning of the 14th, it appeared as a well-defined storm near Valencia, and, moving slowly eastward during the day, was central near Yarmouth on the 15th; strong northerly gales prevailed throughout the British Isles, on the 14th, while in France, the winds were fresh to strong southwesterly, and in Holland and northwestern Germany, they were southeasterly. During the 15th, the course changed to southerly, the pressure increasing rapidly in rear of the depression, and, by the 16th, the centre of disturbance had reached Paris, causing strong westerly winds on the French coast. A secondary depression (low-area xviii) appears to have formed in central Germany on the 16th, while the original depression apparently followed a southeasterly course through France, with increasing pressure at the centre, and, on the 17th, when near the Mediterranean, it ceased to exist as a depression.

XVIII.—This depression developed in central Germany on the 16th, when the storm, described as low-area xvii, was central in France. This depression apparently increased in intensity as number xvii gradually filled up; it moved in a northeasterly direction toward the Baltic, which it crossed, and, on the 17th, the centre was in southern Sweden, where it finally disappeared. This area and the preceding, were generally accompanied by heavy rains and slightly higher temperature.

XIX.—This disturbance apparently developed in Greenland on the 16th, and was central in Iceland on the 17th. Its course then became southeasterly and the centre moved toward the Orkneys on the 18th; on the 19th, it was apparently off the southwestern coast of Norway, attended by slightly lower temperature, general rains and strong westerly winds over Great Britain. On the 20th, the disturbance passed northwardly over Norway, and on the 21st, was again central off the coast; on the 22d, the depression was apparently central in northern Norway, with slightly increased pressure, and on the 23d, it disappeared in the Arctic regions.

XX.—This area developed in Austria on the 20th, and, moving eastward, appeared as a well-defined low-area near Hermannstadt on the 21st. During the 22d, 23d and 24th it moved slowly eastward over the Black sea, and disappeared in southeastern Russia on the 25th.

XXI.—On the 29th, a decrease of pressure occurred over northern Norway and Sweden, and by the 30th, a well defined and deep depression was central near Tromsoe, the barometer at that station reading 29.36, (745.7) being a fall of 0.47 inch in twenty-four hours.

Concerning the storms occurring in Asia, the following is given:

XXII.—This appeared in the region lying northwest of Corea, on the 9th, and pursued an unusual course toward the southeast. On the 10th, the disturbance was probably central near Nagasaki, and disappeared south of N. 30° on the following day.

XXIII.—This depression developed northwest of Pekin on the 20th, and crossed the gulf of Pe-Chi-Li, on the 21st. Following a northeasterly course, the disturbance moved over the island of Niphon during the 22d and 23d, and disappeared to the northeastward of that island on the last-mentioned date.

The following descriptions of the four typhoons that occurred during the month of September, are taken from the "Bulletin Mensuel," published by Mr. Marc Dechrevens, Director of the Observatory of Zi-Ka-Wei, China.

I.—(11th to 19th.) Probably developed to the eastward of Luzon, and appeared northeast of that island on the 11th, moving toward the northwest. By the 13th, the disturbance had passed the northern point of Formosa; its northwesterly movement appears to have been barred by the Chinese coast, as, when near the 28th parallel, the course changed to northeasterly and the disturbance advanced toward Nagasaki. It then moved over the sea of Japan, apparently avoiding the land and skirting the western coast of Niphon. During the preva-

lence of this typhoon, its progressive velocity appears to have varied considerably; on the 11th it was about six miles (eleven and five-tenths kilometers) per hour, and by the 16th, the velocity had increased to about thirty miles (fifty-five kilometers) per hour. An interesting peculiarity appears to have existed in this storm; the barometer at Takau (Formosa) falling very rapidly, and after the passage of the centre it rose very slowly; while, in Japan, the contrary was observed, the barometer falling slowly in advance, and rising rapidly after the centre had passed. Owing to the slow decrease of pressure and the prevalence of light winds, the presence of this storm was quite unexpected at Nagasaki; when the barometer reached the minimum at that station, violent winds occurred, a tree measuring ten feet in circumference being blown down and the fragments carried a considerable distance. Vessels passing near the centre, on the 14th, report the barometer as reading 29.30 (744.) and 29.46 (748.); on the 15th, the s. s. "Appiu," near the centre, reported barometer 29.74 (755.)

II.—(15th to 19th.) This typhoon appeared east of Luzon on the 14th, and advanced in the usual course from east to west. It entered the China sea by the channel of Bashee, between Luzon and Formosa, and was central north of Luzon on the 15th. On its approach to Hainan and the gulf of Tonquin, violent southeast winds and rain occurred at Hong-Kong on the 17th, and the barometer fell to 29.71 (754.7), with strong east-northeast to northerly winds, at Pakhoi on the 18th.

III.—(18th to 25th). During the first part of its course, this disturbance, moving in a northwesterly direction, skirted the eastern coast of Luzon; its course changed when near the twenty-second parallel of latitude, and the disturbance advanced in a west-southwesterly direction, and crossed the northern part of the island of Hainan on the 25th. While this typhoon was moving over the China sea from east to west, a barometric depression (number xxiii.) was, at the same time, central near Japan, and moving in an east-norteasterly direction. This depression caused severe storms in the gulf of Pe-Chi-Li, the s. s. "Appin" reported, on the 22d, winds veering from nw. to n. and nne., force 9.

IV. This typhoon was remarkable for the extraordinary depth of the atmospheric depression, the minimum barometer recorded being 27.04, or 686.9 millimetres. The disturbance developed in the Pacific, east of Formosa, and crossed that island on the 27th; moving in a westerly direction, the typhoon entered the continent south of Swatow and in the direction of Canton. On the 26th, the ship "Cilurnum" experienced the typhoon near Formosa and lost mizzenmast and sails. The ship "Châteaubriand" reported barometer falling from 29.64 (752.9) to 27.04 (686.9) in four hours. When the barometer reached its lowest point, the ship was in N. 22°, E. 121° 20′, on the 27th, with winds changing from northwest, force 12, to almost calm for thirty minutes, followed by south to south-southeasterly winds of force 12. Reports from other vessels near the centre differ very slightly from the values reported by the "Châteaubriand," and leave no doubt as to the correctness of that report and as to the extraordinary depth of the atmospheric depression attending this typhoon, the diameter of which appears to have been about three hundred and forty miles.

OCEAN ICE.

August 1st: s. s. "Hohenstaufen," near Cape Race, passed two large icebergs.

2d: Bark "Exile," in N. 46° 50′, W. 46° 00′, passed a small iceberg; s. s. "Vandalia" passed several icebergs, the smallest of which was supposed to be one hundred feet high; also reported much ice in track of vessels.

16th: s. s. "Lord Gough," in N. 48° 11′, W. 48° 16′, passed a large iceberg.

TEMPERATURE OF THE AIR.

The distribution of mean temperature over the United States and Canada for the month of August, 1882, is exhibited on chart number ii., by the dotted isothermal lines. The table of mean comparative temperatures, in the lower left-hand corner of the chart, shows the average temperatures for the month in the several districts, as determined from observations taken at Signal Service stations during the month of August for previous years. The second column shows the mean temperature of the current month; the third column shows the departures of the mean of the current month from the mean of several years.

The temperature has been slightly above the normal in New England and Florida, and normal in the middle and south Atlantic states. Westward of these districts, an area of deficiency covers the whole country east of the Rocky mountains, except in the extreme northwest and in the northern slope, where it has been 1°.2 above the normal. The most marked departure occurred in the southern slope, where the mean temperature was 6°.6 below the normal. West of the Rocky mountains the departures have been from 1°.6 below the normal in the southern plateau to 1°.6 and 1°.5 above the normal in the south and north Pacific coast regions, respectively.

DEVIATIONS FROM MEAN TEMPERATURE.

Under this heading, departures exhibited by the reports of the regular Signal Service stations are shown in the table of comparative temperatures on the left-hand side of chart ii. The following items of interest in connection with this subject are reported by voluntary observers:

Illinois: Riley, mean temperature, 68°.6 or 0°.1 below the August average of the past twenty-one years. The mean temperature of the summer of 1882 is 2°.8 below the summer average of the same period; and is 0°.1 below the mean of the coldest summer, which occurred in 1875.

Indiana: Logansport, mean temperature, 74°.2 or 0°.2 above the August average of the past twenty years. During that period the highest August mean, 80.0°, occurred in 1881; the lowest, 62°.7, occurred in 1863.

Iowa: Clinton, mean temperature, 70°.6, is about the August average.

Kansas: Yates Centre, mean temperature, 73°.3 or 5°.9 below the August average of the past two years. The mean temperature of the summer of 1882, is 3°.6 below the average of the two preceding summers. Lawrence, mean temperature, 72°.55 or 4°.33 below the August average of the past fifteen years. During that period the highest August mean, 83°.45, occurred in 1874; the lowest, 72°.5, occurred in 1875. The mean temperature of the summer of 1882, is below that of any summer for the past fifteen years. Wellington, mean temperature, 72°.2, or 5°.9 below the August average of the past four years. The maximum temperature of the month (98° on the 15th) is the lowest August maximum of the same period. On August 3d, 1880, a minimum temperature of 47° occurred, being 2° below that of August, 1882.

Maine: Gardiner, mean temperature, 67°.0, or 0°.21 above the average of the past forty-six years.

Maryland: Fallston, mean temperature, 71°.02, or 1°.13 below the August average of the nine years from 1872 to 1880 inclusive. During that period the highest August mean, 75°.88 occurred in 1872; the lowest, 70°.55, occurred in 1874.

Missouri: Saint Louis, the Missouri Weather Service reports, mean temperature, 74°, or about 3° below the August average of the past forty-five years. During that period the lowest August mean, 72°.3, occurred in 1875, and in seven different years has the mean temperature of August been as low or lower than that of the present year.

New Hampshire: Grafton, mean temperature, 65°.8, which is above the August average of the past four years. During that period the highest August mean, 68°.4, occurred in 1878; the lowest, 61°.2, occurred in 1879.

New York: Palermo, mean temperature, 66°.6 or 3°.2 below the August average of the past twenty-nine years. During that period the highest August mean, 79°.1, occurred in 1868; the lowest, 62°.0, occurred in 1860.

North Volney, mean temperature, 68°.71 or 0°.27 above the August average of the past fourteen years. During that pe-